

AN

EPITOME OF A LECTURE

ON

OTTAWA PRODUCTIONS,

DELIVERED BEFORE THE

BYTOWN MECHANICS' INSTITUTE AND ATHENÆUM,

ON TUESDAY, NOVEMBER 15, 1853,


By EDWARD VAN-CORTLANDT, Surgeon,  
HONORARY LIBRARIAN TO THE INSTITUTE.

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## VARIOUS CONDITIONS UNDER WHICH IRON IS FOUND.

### NATIVE IRON.

It is generally supposed that Iron never exists in the metallic state, but it is asserted that pure unadulterated Iron has been discovered at Canaan in the United States. Native Iron is likewise produced by the spontaneous ignition of Coal in the neighbourhood of Iron deposits, and where it is known under the name of Native Steel. The greatest quantity of Iron is found combined with Sulphur Oxygen or Carbonic Acid, the first known as Iron Pyrites, is never worked as an Ore. The best Iron Ores are Oxides, but the greatest portion of British Iron Ore is a Carbonate.

### METEORIC IRON.

The Histories of all ages acquaint us of huge masses of Iron being found in various parts of the Globe, and which are considered to be of meteoric origin, and in point of fact two masses of such were actually seen to fall at Hadrachina, near Agram, in Croatia, in 1751. Several masses have been found in Africa, and in America, and Siberia—the last mentioned was discovered by Professor Pallas, and weighed 1600 pounds. An enormous mass weighing 15 tons, was found in Peru, by Don Rubin de Celis. Capt. Parry took some knives home which he obtained from the Esquimaux in one of his voyages, and which were made of Meteoric Iron. There is a mass of it which weighs three thousand pounds, deposited in the Natural History Lyceum at New York, and which was found at Red River, Louisiana; and a portion of a mass of Meteoric Iron, which fell at Santa Rosa, near Bagota, was manufactured into a sword and presented to Bolivar.

### MAGNETIC OXIDE OF IRON.

*Oxydulous Iron, Octahedral Iron.*

It is this variety of Iron Ore which produces the Native Loadstone. It occurs in various parts of the world, especially in the North of Europe, and is that of which the best Swedish Iron is made, and it yields also the Wootz Steel of the East Indies. It is of an Iron black colour, darker than common Iron; its powder is pure black—it exerts a decided action on the magnetic Needle, attracting and repelling, according as the positive or negative points are presented. This variety, which is found in several parts of this continent is called, Native Loadstone. It is infusible before the blow-pipe, and soluble in Nitric Acid; it occurs in primitive rocks, chiefly of mica and gneiss; it is exceedingly rich in metal, yielding 80 per cent. It is very abundant in Sweden, and at Gallivara, beyond the Polar Circle, it constitutes an entire mountain. In the United States it exists in the greatest abundance, and is worked in several places. On the western side of Lake Champlain, it is found in beds of 20 feet thick. Its ore produces

the best steel and on this account it is that English weapons of superior description are always made of Swedish Iron.

This ore exists in inexhaustible quantities in various parts of the Valley of the Ottawa.—The specimen before us was obtained from Lot No. 11, 7th concession of Hull, and only four miles from the falls of the Chaudiere, where it constitutes a bed 20 feet in thickness, and there is a water power within 300 yards of it.

On the authority of Mr. Murray, the assistant Provincial Geologist, we are enabled to state that a remarkable mass of magnetic Iron ore exists on the 24th Lot of the 6th concession of South Crosby, on an Island in Mud Lake, not far from Newborough, on the Rideau Canal; it has a breadth of ore of considerable purity of seventy yards. "The great supply of ore, says this gentleman, that might be here obtained, the proximity of wood in abundance for fuel, and the existence of water power at no great distance, combined with the advantage of a navigable canal, the water of which is in contact with the ore, render the locality well worthy of attention to such as are disposed to attempt the smelting of Iron in the Province."

The Geological formation yielding the magnetic oxides of Canada and those of the United States (where they prevail in equal abundance) are identical, says Mr. Logan, and it is probable they are both of the same formation as that of the Swedish mines. But the practical experiments on Canadian ores are still so few that nothing can yet be proved from them.—*Vide Report of Geological Survey, 1851-'52, page 46.*

### SPECULAR IRON ORE, RED IRON ORE, IRON GLANCE.

The lustre of this ore of Iron is metallic, its colour a dark steel gray, it is infusible before the blow-pipe, but melts with Borax. The great locality of this ore is the Island of Elba, which has been noted for producing it for sixteen centuries back, and its mines are considered inexhaustible; but it is also found in Saxony, Bohemia, Sweden, Siberia, Massachusetts in the United States, in England, and lastly but not least, in the Township of McNab on the Ottawa River.—Wherever it exists it is explored with profit. It is found at Ticonderago, where it is pulverized and used as a polishing powder. Most of the plate iron and iron wire of England are manufactured from this ore. It is extensively used in the button trade as a polisher, and the ore most in demand for this purpose comes from Spain. The best specimens for button polishing command a very high price, and are generally obtained from small pebbles;—it is worked at Utica in the



United States with profit. This ore exists in enormous quantities at the mouth of the Madawaska in McNab Township; it is a very valuable species and is very easily smelted, and possesses every requisite for that purpose on the spot. A splendid specimen of this ore was presented to the Bytown Mechanics' Institute at the time of our Exhibition, and attracted the marked attention of the Governor General. The ore bed is twelve feet in thickness, and will yield 25 tons of pure iron for every fathom in length and depth. The ore contains 59 per cent of pure metal,

#### BOG IRON ORE.

##### *Hydrated Peroxide of Iron, or Brown Iron Ore.*

This Ore is generally found in detached portions at the bottom of shallow lakes and morasses, and hence its name—Bog Iron, and possesses several characters in common with Specular Iron Ore. It is made up of numerous aggregated fibres, and in colour it is invariably some shade of brown; it is very brittle, and possesses no magnetic power. On some occasions we meet with it in a more or less pulverized condition and assuming the appearance of an ochre, but it differs from all the other Ores of Iron, in containing water in large quantities, not simply absorbed, but constituting a characteristic part of the Ore, being chemically combined with it in the proportion of one-sixth.

Bog Iron Ore is only found in limited quantities in England, France, and Siberia. It is uncommon in the northern countries of Europe, but in Germany, France, and Austria it is extensively worked. At Salisbury in Connecticut, it exists to an unlimited extent, and has been worked for more than one hundred years, yielding from this locality alone the large quantity of two thousand tons of Iron annually.

The Iron obtained from Bog Ore is said to excel in toughness and hardness, and to be preferable to Red Iron Ore on that account, whilst the purer varieties, on being melted with charcoal, may be readily converted into steel of an excellent quality.

Bog Iron Ore is of more recent origin than any of the other Ores of Iron, and its deposition is going on continually, even at the present time in shallow lakes and swamps. In the south-western parts of New Jersey, where Bog Iron Ore occurs in great abundance, many spots previously exhausted are explored again successfully, after the lapse of about twenty years. And what is more curious than all we have yet said of it is, that it is brought to the state we find it in through the intervention of an infusorial animal called the *Guillonella ferruginea*.

At Sweden, Bog Ore has been fished up from the bottom of the sea, where, according to Hansmann, it is still produced. It is worked in every quarter of the globe, but its Ore is generally used for castings, which are said to take a sharper impression from the phosphoric acid, which Bog Iron Ore always contains. The Iron produced at the St. Maurice forges at Three Rivers, is obtained entirely from Bog Iron Ore, and is, as is well known, of an excellent quality, and is just now largely worked by the Hon. James Ferrier, of Montreal; and a new company has also started

in opposition, headed by Mr. Hale. These forges were commenced by the French Government in 1737, and it is said most of the French cannon handed to the British at the capitulation were made there.

During the last American war these forges were of signal service to the British army, having manufactured a large number of cannon balls and shells, at a time they were much needed.

It exists on the Ottawa on an eight feet bed at Cote St. Charles, on Lots 16 and 17, the property of Mr. R. Lancaster, who kindly forwarded these specimens to the Exhibition. Bog Iron Ore is known to exist in the Township of McNab, and other localities in the Valley of the Ottawa, but which as yet have not been explored.

"To metallurgists the good quality of the wrought Iron of the St. Maurice forges (says Mr. Logan) appeared the more deserving of attention, as the ore from which it is derived, being the Hydrated Peroxide, is usually accompanied by a small amount of Phosphorus, in the form of Phosphate of Iron. It is difficult to remove this impurity which in too large a quantity renders the metal cold short. In cast iron however its presence in small quantities cannot be called prejudicial, as it serves to render the metal very fluid when fused, and thus to give a fine surface to the castings, and bring out all the details of ornamental patterns in sharp relief, whilst it does not seem to render the casting brittle or to deteriorate its power of resisting the effect of sudden heating and cooling. "The Peroxide of McNab contributed to the Exhibition in London by Mr. Sheriff Dickson, of Pakenham, was regarded as a very beautiful ore, the uniform quality of which would render it one of much more easy fusion and management than the magnetic oxides, while it would probably produce an iron of excellent quality."

#### IRON PYRITES.

##### *Bisulphuret of Iron.*

Is found in small cubical chrystals, in veins amongst Slate and Coal Fields, where, by oxidation and its conversion into Sulphate of iron, it not unfrequently, by raising the heat to a great height, causes the ignition of the Coal. It is also found accompanying the ores of many other metals, and often replaces the remains of animal and vegetable substances.

In Terra del Fuego, at the extremity of South America, the natives procure fire by rubbing a piece of iron Pyrites very briskly against a flint, and catching the sparks upon dry moss,—a striking approximation to our flint and steel.

Iron Pyrites is never used for the purpose of obtaining metallic iron, but is employed in the manufacture of Alum, Copperas, and Sulphuric Acid, consequently is of little value to us in this part of the Globe.

Mr. Logan referring to the Iron Ores of Canada, as they appeared at the Great Exhibition, remarks "The vast supplies of Iron with which the collection gave evidence that the Colony is enriched, appeared to arrest the attention of all. The British Miner accustomed to follow into the bowels of the earth, beds of ore of six inches to one foot, containing between 30 and 40 per cent, of this



important metal, naturally regarded with surprise, huge blocks of it from beds of 100 and 200 feet in thickness, and yielding 60 to 70 per cent.;" And again, "the Canadian Iron Ores were examined with great care and attention, by the agents of Russia; it seemed to strike them with wonder that such prodigious sources should be found in any country but their own, and the public in general, without taking into consideration the question of its present application to profitable uses, seemed to regard the great beds of Magnetic Oxide, as national Magazines, in which was stored up a vast amount of a material indispensable to the comfort and progress of mankind, which it is always satisfactory to the inhabitants of a country to know is within their reach and control, should circumstances arise to render its application expedient or necessary.—[Vide report for 1851 and 1852, pp 45 and 46.]

#### PLUMBAGO.

*Graphite, commonly called Blacklead.*

Plumbago is found in various parts of the world. in detached rounded lumps and in veins of mica slate, Gneiss, and in transition rocks, and altho called Blacklead, there is not one atom of lead in its composition, it being a Carburet of Iron. It is found of the best quality in a mountain called Borrowdale in Cumberland. The mine has been worked since the days of Queen Elizabeth, and is now nearly exhausted, the consequence of which is that the Cumberland blacklead brings a very high price.

Plumbago also exists in many other parts of the world, where although not of a quality fit for lead pencils; it is profitably worked for other purposes, chiefly for converting into crucibles; it is used however for polishing grates and stoves, to prevent the friction of machinery, and as a preservative of iron from rust. On the Ottawa it is known to exist of a very pure quality at the iron mine in Hull, but as yet in such small quantities, as not to warrant its being worked. It exists also tolerably pure at Devils Lake near Newborough, on the Rideau Canal. It is also found in large quantities, but of an inferior description, at Grenville, yet if properly cleared would no doubt answer for crucibles.

The opinion of some of the great Pencil-makers of the metropolis was obtained by Mr. Logan in regard to its applicability to the purposes of their trade and "although it was found that the Plumbago could by washing be freed from its impurities, and by pressure after the method of Mr. Brockedon be converted into pencils, they would be considered of inferior quality."

#### LEAD ORE—GALENA.

Lead was well known to the ancients, and was used in Britain from very early times. Amongst the Romans it constituted a most important article of commerce, blocks and pigs of it having been frequently discovered bearing Latin inscriptions, and the remains of Roman Establishments are found in the neighborhood. Several pigs of lead are deposited in the British Museum bearing Roman inscriptions.

After the departure of the Romans the Saxons continued to work the lead mines, and are supposed to have been the first who buried their dead in

lead coffins, the remains of which are frequently met with in various parts of England. In the casting of lead, and where it is rapidly cooled, a cavity is produced, and which in rifle bullets is instrumental in causing them to swerve from a rectilinear course; on this account rifle and musket balls are frequently formed from rolled lead. If rain or river water is exposed for any length of time in open leaden vessels, the metal becomes oxidized and deleterious, and in cases where danger is to be apprehended in this way from cisterns. Doctor Christison advises their being filled with a very weak solution of phosphate of soda, by which they become covered with an insoluble coating.

Lead ore is found in several parts of Canada. It either is or has been worked near Kingston, with what results I do not know. It abounds on the Ottawa, and some where in our immediate vicinity on the Gatineau, it is said to be so plentiful and so easy of access as if discovered to admit of being worked most profitably. But the secret of its locality is confined to the Indians, who look upon it with so much superstition that nothing can bribe them to divulge it; they are under the impression that when the white man discovers it their race is to be swept away. I have in my private collection an Indian pipe made from an Oaken knot, the bowl of which is most ingeniously lined with lead—it was found in an Indian grave at Rice Lake. It is found also in large quantities on the land of Mr. Marshall at Fitzroy, and ere long I have no doubt the Ottawa, amongst its existing and prospective manufactures, will add Lead to the number.

#### COPPER.

Native copper is as yet only known to exist in Canada in quantities worthy of attention at the Bruce and Wallace mines, Lake Superior, where a company is just now working it very profitably—it is of a very pure description. We have a spear head in the museum, evidently made of native copper and shaped by hammering, which was picked up in Renfrew. It is probable that it was left there by some of the migratory tribes of Indians during their incursions across the country on their way to the Ottawa, with a belligerent intention.

There is an engraving of a spear head in the Canadian Journal for January 1853, identical in every respect with our specimen, and which is described as a relic of the ancient miners of Lake Superior. It at all events shows us that the Aborigines were acquainted with the metal.

Having now concluded our description of the metals, we hasten to enumerate some of the Refractory materials and minerals of the Ottawa, amongst which are included.

Marbles, white, mottled green, gray, brown, and of superior quality and easily worked, Millstones, Grindstones and Whetstones, Sandstone white and yellow for the manufacture of Glass, Phosphate of Lime and Shell Marl, highly important as manures Hydraulic Limestone for making Hydraulic Cement.

Dolomite for the manufacture of Epsom Salts and containing 45 per cent of Carbonate of Magnesia.



Steatite or Soap-stone which is applicable to various purposes, since it is used in the manufacture of Porcelain and for polishing Serpentine Marble and Mirror Glasses. It constitutes the basis of Cosmetic powders, and is a main ingredient in antiattrition pastes, and dusted on the inside of new boots it causes them to slip on easily, lastly it removes grease spots from silk and woolen cloths.

Amongst the minerals in the Ladies department, and applicable to Jewellery, we have Labradorite, which when looked at in different lights assumes

the hues of changeable silk. Sunstone Hyacinths and Oriental Rubies and Sapphires, together with Amethyst, Garnet and Peristorite, a new mineral discovered by my esteemed friend Doctor Wilson, of Perth, and deriving its name from the appearance it assumes of the beautiful colour of a doves breast.

#### Clay for Bricks, Tiles, &c.

Pottery clay of several varieties, also exists very generally throughout the Ottawa country.

## OF THE WOODS OF THE OTTAWA.

Amongst the ordinary wants and prerequisites of the human family, there is none involved in more doubt and darkness than the origin of Fire. And it is not known whether its first discovery was referable, to the direct action of the Suns rays, to spontaneous combustion, to percussion, to friction, or to an accidental mixture of different substances. The generally received opinion, however, is that the most primitive mode of producing it artificially was by rubbing two pieces of dry Wood together, a means still resorted to by the Aborigines of many continents and Oceanic Isles. At all events, there is little doubt that the first Fuel consisted of Wood, however questionable the means by which fire was first obtained, and it is quite certain that it was used as such, even at the most remote periods.

### Evergreen Trees — Pines.

#### RED PINE.

*Pinus Resinosa, Pin Rouge.*

Is a large handsome Tree with scaly red bark. Its timber enters largely into commerce, and is fine grained and of close texture; it is shipped in the form of squared logs, and as well undressed as Spars for Masts and Yards, for which purposes it is in great request, some deals are also manufactured from this wood. From its superior strength it is used for rafters in England, and is well adapted for supporting the slate and tile roofs of Britain, and owing to the great distance Lumberers have to go in search of it, it brings the highest price in the market. By far the largest quantity of Red Pine is derived from the Ottawa, and on the banks of some of our tributaries, large tracts of sandy land are entirely covered with it. It constitutes the only open Wooded Tree in Canada.

#### WHITE PINE.

*Pinus Strobus, Pin Blanc.*

This is the commonest and most majestic of all our Pines, towers over all the other trees of the Forest, and attains a very great size. When growing in open situations, it is often feathered down to the ground, and when loaded with its large pendulous cones assumes a very beautiful and picturesque appearance. White Pine is easily wrought, comparatively free from knots and very durable. Its timber is most in demand for ordinary domestic purposes, a fact fully demon-

strated by the tens of thousands of Logs, we see everywhere about our Saw Mills. From its superior size and lightness the lower masts of Ships are generally made of it, and its possessing the property of not splitting by the sun, fits it for their decks. This wood is our most extensive article of commerce and is shipped in the shape of Masts, Planks, Boards, Shingles, Laths, and Squared Logs. This is one of the trees which furnish the Gum with which the Indians pay over the seams of their Canoes.

#### PITCH PINE.

*Pinus Rigida.*

Is the most symmetrical and beautiful of all the family of Pines, although it seldom attains a great size and never thrives except on the most arid and sandy soils. As its name indicates, it is chiefly employed for making Pitch. It is an extremely rapid growing tree, and exists in large quantities at Sandy point Torbolton, and although every tree on this locality was destroyed by fire about ten years since, they have been reproduced in numbers and of sizes already, which, but for the indisputable evidence of the neighbouring Farmers could scarcely be believed. Tar and Lampblack are largely manufactured from this tree, in Vermont by a very simple process. The knots being incorruptible, are found abundantly in groves of this pine which are collected and piled upon a stone hearth, covered with sods and earth, and sett on fire, the heat soon expels the Tar which runs down a groove cut in the stone for that purpose. The Lampblack is only the condensed smoke of the same fire collected in large Wooden Troughs. The only purpose this wood is converted to when worked, is Pump-making.

#### SPRUCES.

*Hemlock Spruce, Abies Canadensis, Pruche.*

This tree is exceedingly abundant throughout Canada. It is a noble species rising to 80 or 100 feet, and measuring often from 2 to 3 feet in diameter. It is of slow growth and is supposed to require 200 years to attain its full size. When from 25 to 30 years old, its appearance is exceedingly elegant, but when older its large broken limbs detract from its symmetry and beauty, and the naked stumps of the old limbs give the tree an appearance of decrepitude and decay. The wood is not of great value, and is chiefly employed for

fathes and coarse indoor work. The bark is very valuable as a substitute for Oak bark in Tanning, and is that almost exclusively employed in our Tanneries. A decoction of its bark is used as a sudorific, whilst a fomentation made by boiling its branches, is considered by Shantymen to be a Panacea for Rheumatism, and all sorts of swellings, and the "Sovereign'st thing on earth for a green wound."

#### BLACK SPRUCE.

*Abies Nigra, Epinette Noir.*

Is a native of the most inclement portions of our continent, growing most densely and presenting a very sombre appearance; and as large tracts of country are frequently covered exclusively with this tree, it has gained for them the appellation of Black Wood Lands. It is remarkable for the regularity and symmetry of its branches, which taper in the most beautiful pyramidal manner from the base to the summit. The timber is of great value, and is used from its straightness, lightness and elasticity, for the yards of Ships and to "bend like a Black Spruce topmast" is a common saying amongst Sailors; it is also used for the knees of Ships and other craft. From it is extracted the Essence of Spruce, so well known for its Antiscorbutic properties and so largely employed in the manufacture of Spruce Beer. Large quantities of this timber are annually shipped off from Quebec, chiefly for the Irish market.

#### BALSAM SPRUCE.

*Silver Fir, Abies Balsamea, Sapin.*

This is a beautiful ever green tree, rising in a pyramidal shape from 30 to 40 feet. In open and cultivated grounds it becomes feathered down to the bottom, it is consequently much in demand as an Ornamental Tree. It is this tree which furnishes the Gum de Sapin, or Canadian Balsam, sold largely as a substitute for and under the name of Balm of Gilead, an article of Eastern production, and which brings a high price in the market. It is also in the chief ingredient in several descriptions of Varnish, and particularly valuable for prepar-

ing a transparent limped varnish for water colour paintings.

It is the branches and leaves of this tree which furnish the Lumberer with a rude and primitive bed, when far removed from the abodes of man, hunting up Timber-groves in the forest.

#### RED CEDAR.

*Juniper Virginianas, Cedar Rouge.*

The Canadian Red Cedar is identical with the Bermuda Cedar, which is so largely employed by the Pencil makers. It grows from Cedar Island, Lake Champlain, to as far south as the Gulf of Mexico. It attains a height of about 60 feet; grows on the most sterile regions, and may frequently be seen springing out of the crevices of rocks growing most luxuriantly without any apparent nourishment. In this section of the country it is not applied to any particular use, but in the western district is largely used for fence rails. There is a peculiarity connected with this tree which although very ornamental, never produces two specimens alike, that is two trees of the same shape. A resinous gum called Gum Sandarach is obtained from the Red Cedar, which when pulverized is known under the name of Pounce and used as an absorbent of ink and to prevent its spreading over the newly erased surface of paper; it is also largely employed by Cabinet-makers for making a superior transparent varnish. The essential oil is very fragrant and imparts a most agreeable odour to leather and to it books in Russia owe their inviting smell.

#### WHITE CEDAR.

*Thuja Occidentalis, Cedre Blanc, Arbor Vita.*

The White Cedar never attains any great height and is so universally known as the occupant of Cedar Swamps, that any lengthened description is uncalled for. The wood is soft, smooth, extremely light, and possesses an aromatic smell. It retains a permanent shape, and is so extremely durable as to have led to the saying, "as sound as a Cedar post." It is chiefly used for fences and the sleepers of cellars, and from it the Indian shapes the ribs of his frail bark.



### YOUNG MEN OF BYTOWN,—

At the same time that the main object of our Lectures is to excite in you a taste for scientific and useful knowledge, other means have not been overlooked of affording you facilities for their further cultivation. The President of the Institute told you in his clever Inaugural Address the number and the nature of the Books which grace our shelves, and it is for you to show how far you appreciate the labors of the Managing Committee, both by a constant attendance upon the Lectures and a more or less uninterrupted attendance at the Reading Room and Library during the long winter evenings. This is the season for Early Shop Shutting, and when the labours of the day are over (to borrow a simile from the sacred Psalmist,) you must not sit down "like a Pelican in the wilderness or an Owl in the desert." Try to merit a comparison to a more noble bird than one whose indolence and inactivity is only surpassed by its gluttony. Never be called the Pelicans of the Oyster Saloon, or be likened to the Owl, whose deeds are always associated with dark-

ness and seclusion; avoid the Pigeon-hole, and shun these secluded haunts of vice and infamy, the Nine-pin Alleys. Aspire to be somebody and something, and by a proper application and well-directed study, at no distant day some of you, I have no doubt, will fill and do justice to the post of honor which has, without any merit on my part, been assigned to me this evening. You must be up and doing while it is day; imitate the Spartan youths, and avoid sloth and luxury;—for this is the summer of your day, and you know from good authority that "He who gathereth in Summer is a wise son." We live in utilitarian times; the march of man is onwards. New revelations are going on daily around us, and it would seem as if the striking prophecy of Daniel, that "Men shall go to and fro on the earth, and knowledge shall be increased," was about being literally fulfilled. On the part of the Managing Committee, I can answer for the readiness with which they will ever co-operate with you in any useful undertaking, and the cheerfulness with which they will acquiesce in any just and reasonable demand.